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The Costs of Producing Major Field Crops in Ohio

E. T. SHAUDYS and G. R. PRIGGE

OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER
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CONTENTS

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The Costs of Producing Major Field Crops in Ohio

E. T. SHAUDYS and G. R. PRIGGE[1]

INTRODUCTION

Crops produced and sold or fed to livestock comprise two-thirds of the cash income earned by Ohio farmers. Profitability is influenced by the crop yields harvested, acreage produced, efficiency of operation, and the handling for sale or feeding of the crops.

Many efficient crop producers earn high hourly returns. However, income opportunities from crop production are limited because of the seasonal nature of the activity and the availability of labor and management during critical periods. Livestock are combined with crops on many farms in order to achieve a desired farm income. The time available for optimal performance of production activities is limited, especially during planting and harvesting. Deviation from the *optimum time* for tillage, planting, harvesting, and marketing frequently results in increased costs, substantial yield reductions, and decreased income.

Farm operators and managers recognize that under-equipping for a production activity may subject the operation to high risk costs. The costs of over-equipping can be equally high. A rational economic goal is to equip the farm at the level of investment relative to anticipated risk for the productive work to be performed.

Effective and efficient use of available resources influences the return earned for the contributed operator's labor and management. All productive inputs other than operator management and labor must be purchased. Income earned in excess of acquisition costs of purchased inputs can be enjoyed as a labor and management income.

Continuing changes are occurring in farming methods, farm managerial abilities, and technology. Rapid changes in production and marketing technology require that farm operators be adaptive. Some farmers continue to follow the same rotations and use the same production and management techniques year after year because of custom and habit. New technological developments such as seed varieties, fertilizers, and modifications in markets and marketing opportunities necessitate changes to maintain the most profitable combination of crops and practices which should be used on a particular farm. Many farm operators consider it desirable or necessary to personally perform critical activities, such as planting, which can have a significant impact on yields, costs, and income. The limited time available for these critical operations must be efficiently used in assembling and operating the equipment required. Inefficiencies in equipment use during critical periods can greatly reduce the operator's potential.

Second in importance to planting is the minimization of harvesting losses, including the field operation, drying, and storage. Many farm operators closely supervise hired labor for all or part of the harvesting activity. Large machines designed to be operated by one individual are in demand and even larger units, if manageable, can be attractive to large producers desiring to minimize unit costs of production and field losses.

CROP YIELDS

During the 2-year period of 1968 and 1969, crop yields in Ohio averaged 85 bushels of corn per acre, 30 bushels of soybeans, 62 bushels of oats, 37 bushels of wheat, and 2.0 tons of hay per acre. During the 1968 season, the 52 farmers participating in this study averaged 89 bushels of corn, 31 bushels of soybeans, 85 bushels of oats, 45 bushels of wheat, 14.5 tons of corn silage, and 2.87 tons of hay per acre. The Ohio Agronomy Guide[2] indicates that the alluvial and terrace soils of western Ohio can, with good management, produce yields of 90 to 120 bushels of corn, 30 to 42 bushels of soybeans, 36 to 46 bushels of wheat, 70 to 84 bushels of oats, and 4.0 to 5.0 tons of hay per acre (three cuttings).

SELECTION OF FARMS

Farms located in the Corn Belt area of Ohio were selected as being representative of commercial operations producing crops as the major source of income. Detailed production and cost information was obtained from 52 operators in 1968 selected as representatives of commercial grain farms in the northwestern, north central, and southwestern Ohio Extension areas (Figure 1).

Area Extension farm management agents contacted each operator prior to the crop production season to gain cooperation for the study and to obtain an inventory of machinery and equipment. Each farm cooperator maintained a record of the labor and equipment, custom hire, seed, fertilizers, chemicals,

[1]Professor, Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Research and Development Center and The Ohio State University, and Professor of Economics and Business, Mt. Union College, Alliance, Ohio.

[2]1970-1971 Agronomy Guide, Cooperative Extension Service, The Ohio State University, Bull. 470.

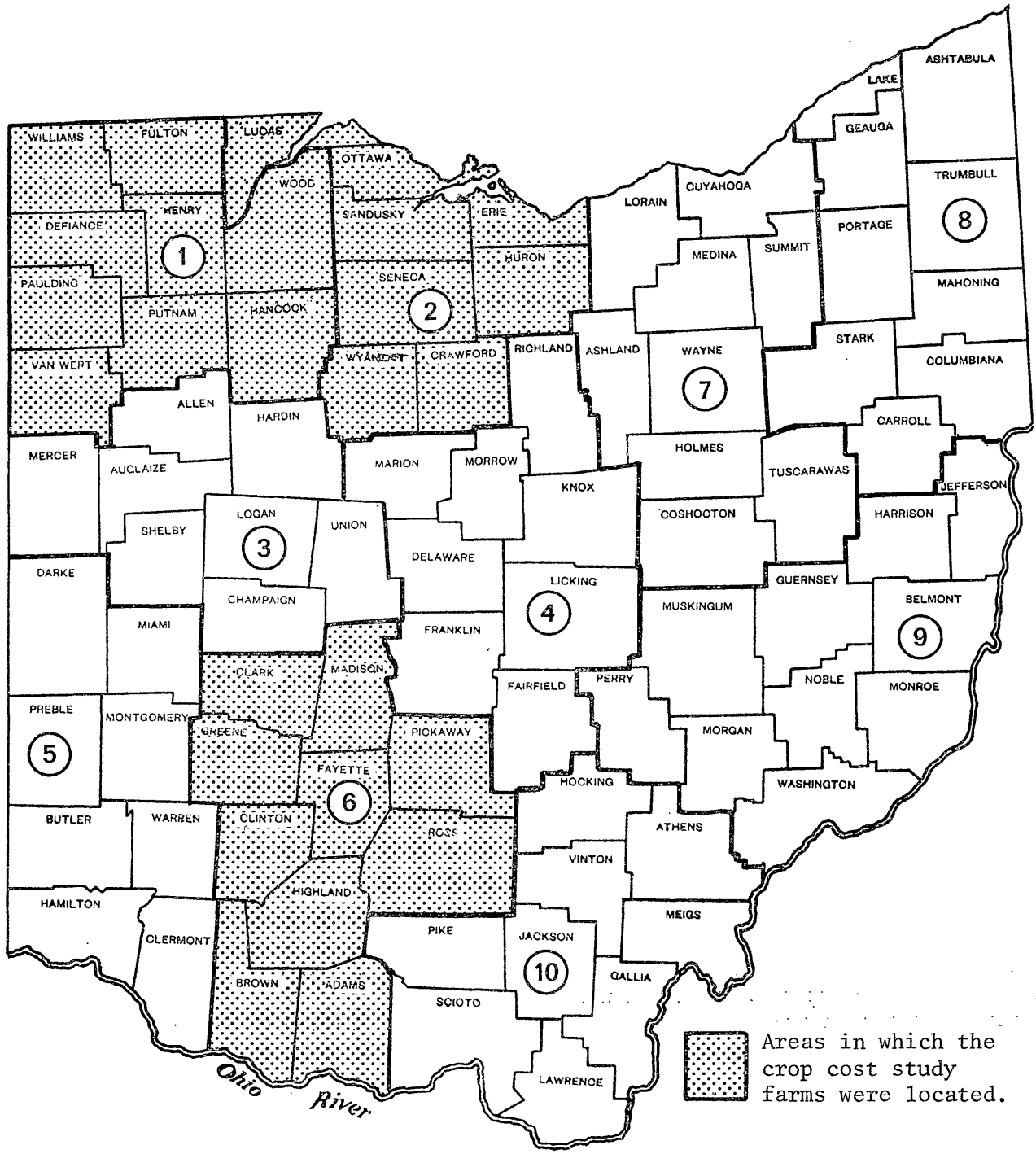

FIG. 1.—Ohio Extension areas.

TABLE 1.—Receipts, Expenses, Net Returns, and Yields per Acre for Selected Farm Crops, Ohio, 1968 (Farms with 500 or More Acres of Cropland).

	Corn	Soybeans	Oats	Wheat	Corn Silage*	Hay†
Number of farms	51	36	22	43	21	24
Yields per Acre	89 bu.	31 bu.	85 bu.	45 bu.	14.5 ton	2.85 ton
Receipts‡	$99.68	$77.50	$55.25	$63.00	$101.50	$64.13
Expenses						
Labor	$ 5.41	$ 5.10	$ 4.18	$ 3.88	$ 6.58	$ 9.91
Tractor	4.85	4.40	3.72	3.47	8.92	6.18
Machinery	19.25	13.05	7.70	12.76	16.70	11.73
Fertilizer and Lime	19.10	2.17	8.79	12.81	19.35	1.40
Seed	4.94	3.65	4.16	4.00	4.80	2.34
Chemicals	2.45	2.33	.18	.02	3.93	.39
Land	30.27	32.60	31.51	31.13	27.65	24.22
TOTAL	$86.27	$63.30	$60.24	$68.07	$87.93	$56.17
Costs per Bushel or Ton	$ .97	$ 2.04	$ .71	$ 1.51	$ 6.06	$19.71
Profits per Acre	$13.41	$14.20	—$ 4.99	—$ 5.07	$13.57	$ 7.96

*Costs for corn silage are for production, harvesting, and storing but do not include the costs of using the silo structure.

†Hay costs are based on acres of meadow harvested: 757 acres of first, 606 acres of second, and 301 acres of third crop hay were made.

‡Prices used to determine receipts were: corn, $1.12 per bushel; soybeans, $2.50 per bushel; oats, $0.65 per bushel; wheat, $1.40 per bushel; corn silage, $7.00 per ton; and hay, $22.50 per ton.

and other materials used in production. Periodic visits were made to each farm to obtain additional production information. Detailed reports were submitted by the farm cooperator to the area farm management agent following each major phase of his crop production activity. After field editing for accuracy and completeness by the area agents, the information was summarized.

FIELD CROP COSTS AND RETURNS

Based on the average prices for these field crops, the 52 crop cost study farm cooperators had a net return of $13.41 per acre of corn, $14.20 per acre of soybeans, $13.57 per acre of corn silage, and $7.96 per acre of hay produced. These same farmers realized an average loss of $4.99 per acre of oats and $5.07 per acre of wheat produced (Table 1).

All costs were based on production methods used and prices paid by the participating farmer operators.

Labor: Actual hours of labor used were reported by farm cooperators and charged at $2.00 per hour.

Tractor and machine ownership costs were determined from information provided by each farmer. The acquisition cost, year purchased, and remaining life were obtained for each machine. Annual straight line depreciation and present inventory value were computed and used as a basis for this annual use cost which was prorated to each crop produced.

Interest, taxes, insurance, and housing were charged at 7 percent of the present value. Fuel, oil and grease, and operating expenses for the motorized equipment were based on the hours of use reported. *Overhead costs* included machinery in the farm inventory but not used during the 1968 year, plus supplies and miscellaneous expenses.

Land charges were computed using 5.5 percent interest for the current land value, plus real estate taxes at 30 mills on 40 percent of the market value of the land.

Corn and soybean equipment costs accounted for 20 to 25 percent of the total production costs. Labor comprised another 6 to 8 percent of the total costs. Equipment and labor accounted for 30 percent of the total production costs. Since labor and equipment substitute, it is significant that total costs for various labor-equipment combinations were similar when the equipment was used in accordance with capacity. Seed and chemicals (herbicides and insecticides) comprise the remaining input costs.

The farms were sorted into quartile groups based on production costs per bushel or ton. The average costs of inputs for the high-cost quartile of farm operators were compared with the average input costs for the low-cost quartile of farm operators. High-cost and low-cost quartiles were used to observe basic differences in production costs, yields, and managerial performance (Tables 2 to 7).

Production costs per bushel of corn for the high-profit quartile group ranged from 65¢ to 81¢ and averaged 74¢ per bushel. The low-profit corn producers had per bushel costs ranging from $1.06 to $2.35, with an average cost of $1.16 per bushel.

TABLE 2.—Costs of Producing Corn, Ohio, 1968.

Item	Production Costs per Acre	
	High Profit 25%	Low Profit 25%
Number of Farms	13	13
Crop Acres per Farm	591	418
Acres in Corn	279	269
Bushels per Acre	107	76
Hours of Labor per Acre	2.6	2.8
Land Charges	$30.24	$30.30
Fertilizer and Lime	17.05	21.14
Tractor	4.20	5.50
Harvest Equipment	6.76	6.51
Other Equipment	6.98	8.56
Labor	5.14	5.68
Seed	4.73	4.30
Chemicals	2.90	3.99
Other	.62	2.41
TOTAL	$78.62	$88.39
Costs per Bushel Harvested	$ .74	$ 1.16

TABLE 3.—Costs of Producing Soybeans, Ohio, 1968.

Item	Production Costs per Acre	
	High Profit 25%	Low Profit 25%
Number of Farms	9	9
Crop Acres per Farm	619	338
Acres in Soybeans	169	94
Bushels per Acre	37	24
Hours of Labor per Acre	2.2	2.8
Land Charges	$30.31	$34.89
Fertilizer and Lime	2.61	1.72
Tractor	3.65	5.14
Harvest Equipment	3.01	2.00
Other Equipment	4.05	8.28
Labor	4.56	5.63
Seed	3.92	3.39
Chemicals	2.95	1.70
Other	.85	1.10
TOTAL	$55.91	$63.85
Costs per Bushel Harvested	$1.51	$2.66

TABLE 4.—Costs of Producing Oats, Ohio, 1968.

Item	Production Costs per Acre	
	High Profit 25%	Low Profit 25%
Number of Farms	5	5
Crop Acres per Farm	339	430
Acres in Oats	22	19
Bushels per Acre	94	56
Hours of Labor per Acre	2.3	1.5
Land Charges	$26.79	$33.01
Fertilizer and Lime	7.46	8.44
Tractor	6.25	2.30
Harvest Equipment	3.42	4.63
Other Equipment	3.49	1.85
Labor	4.65	2.93
Seed	3.00	3.15
Chemicals	.28	.04
Other	.72	1.38
TOTAL	$56.06	$57.73
Costs per Bushel Harvested	$ .60	$ 1.03

TABLE 5.—Costs of Producing Wheat, Ohio, 1968.

Item	Production Costs per Acre	
	High Profit 25%	Low Profit 25%
Number of Farms	11	11
Crop Acres per Farm	463	337
Acres in Wheat	50	40
Bushels per Acre	50	37
Hours of Labor per Acre	2.0	1.9
Land Charges	$28.26	$34.00
Fertilizer and Lime	11.22	14.40
Tractor	3.16	3.78
Harvest Equipment	3.72	4.13
Other Equipment	3.64	7.08
Labor	4.01	3.75
Seed	4.09	3.90
Chemicals	.03	.00
Other	.69	.95
TOTAL	$58.82	$71.99
Costs per Bushel Harvested	$1.18	$1.95

TABLE 6.—Costs of Producing Corn Silage, Ohio, 1968.

Item	Production Costs per Acre	
	High Profit 25%	Low Profit 25%
Number of Farms	5	5
Crop Acres per Farm	639	580
Acres of Corn Silage	44	75
Tons per Acre	18.1	12.2
Hours of Labor per Acre	3.3	3.7
Land Charges	$23.63	$27.30
Fertilizer and Lime	16.93	24.01
Tractor	12.51	8.68
Other Equipment	20.03	12.78
Labor	6.59	7.39
Seed	3.71	4.71
Chemicals	3.71	5.62
Other	.33	1.17
TOTAL	$87.44	$91.66
Costs per Ton Harvested	$4.83	$7.51

TABLE 7.—Costs of Producing Hay, Ohio, 1968.

Item	Production Costs per Acre*	
	High Profit 25%	Low Profit 25%
Number of Farms	5	5
Acres per Farm	580	424
Acres of Hay	48	24
Tons per Acre	3.74	1.68
Hours of Labor per Acre	3.5	4.6
Land Charges	$20.94	$22.14
Fertilizer and Lime	4.76	4.32
Tractor	4.93	9.22
Harvest Equipment	9.72	7.47
Other Equipment	.26	4.24
Labor	7.02	9.18
Seed	1.45	4.29
Chemicals	.64	.57
Other	1.93	5.08
TOTAL	$51.65	$66.51
Costs per Ton Harvested	$13.81	$39.59

*Based on actual acres harvested: high-profit farms, 127 acres of first, 196 acres of second, and 171 acres of third crop hay; low-profit farms, 52 acres of first, 81 acres of second, and 81 acres of third crop hay.

The costs of producing a bushel of soybeans varied from $1.04 to $1.65 for the high-profit farms, with an average of $1.51 per bushel. For the low-profit farms, the costs of producing soybeans ranged from $2.16 to $3.69 per bushel and averaged $2.63 per bushel.

The most significant cost-related differences on these farms were yields per acre. For example, high-profit corn producers achieved an average yield of 107 bushels per acre compared to an average of 76 bushels per acre on the low-profit farms. High-profit soybean producers raised 37 bushels and low-profit producers raised 24 bushels of soybeans per acre.

Land charges were comparable for both groups of farmers, with the low-profit farm operators actually reporting slightly higher land charges than the high-profit group of farmers.

With the exception of harvest costs, machinery charges were higher on the low-profit farms than on the high-profit farms. The lower harvesting costs resulted from the lower yields per acre, requiring fewer hours of equipment use for harvesting.

Differences in fertilizers, chemicals, and labor contributed to the higher per acre and per bushel costs associated with the low-profit farm operations. Some seemingly small but important differences included a slightly *higher seed cost* for the high-profit quartile of corn and soybean producers as compared to the low-profit quartile of farm operators. Although the seed costs were only 53¢ more per acre for corn and 54¢ more per acre for soybeans, these differences suggest the use of better quality seed and/or higher plant populations. Additional expenditure for seed has *leverage* and, if other elements required for growth and production are available, such as fertility, moisture, and weed control, can result in substantially increased yields and income.

In determining which crops to grow, farmers often consider factors other than the relative profits per acre. Livestock programs, markets available, soil conservation, government programs, and labor availability are often considered. Both of the small grains, oats and wheat, were not as profitable as corn and soybeans produced on most farms. The high-income quartile farm operators did produce small grain crops profitably. During the 20-year period 1948-1968, wheat acreage in Ohio decreased from 2.4 to 1.2 million acres and oats from 1.1 to 0.7 million acres. During this same period, soybean acreage increased from 0.9 to 2.3 million acres and corn declined from 3.5 to 3.1 million acres.

Per acre yields of corn and soybeans have increased by about 50 percent during the past two decades. In Ohio, the total bushels of corn and soybeans have substantially increased, while the total bushels of wheat and oats produced have declined from the production of 20 years ago.

Acreages devoted to the production of small grain crops reflect the economic opportunities. It is noted, however, that some farm situations offer advantageous opportunities for small grain production. Although meadow does not appear to be as profitable as corn and soybeans, it is desirable on some farms for the maintenance of organic matter, improvement of soil fertility, and controlling erosion.

HOW SIZE OF FARM AFFECTS CROP COSTS

Size of the farm operation was another factor influencing production cost differences. The high-profit, low-cost per bushel and per acre operators had larger farm units than the high-cost, low-profit farm operators. Differences in profitability are not explained by either costs of inputs or differences in yields alone. Rather, an interaction of costs and yields accounts for the important profit differences.

Crop costs per acre for 600 crop acre farms were lower than 400 crop acre farm operations by the following amounts: corn, $9.50; soybeans, $8.00; and wheat, $14.00 per acre. These reductions in costs were due to lower costs per acre for labor, tractor power, and machinery use. Larger acreages of land in the farming unit did not have lower expenditures per acre for seed, spray, lime, and mineral nutrients.

Machinery costs were higher for large than small machines on a per hour basis. The per acre use cost

TABLE 8.—Crop Costs per Acre by Crop Acres per Farm.

Crop	Crop Acres 400	600
Corn	$88.39	$78.83
Soybeans	63.85	55.91
Wheat	71.99	58.82

TABLE 9.—Tractor Costs per Hour on 38 Ohio Commercial Farms.

Annual Hours of Use	Size of Tractors (Plow Bottoms) 2 or Less	2-3	3-4	4-5	5-6
Less than 100	$2.75	$5.75	$7.50	*	*
100-200	2.35	3.80	4.56	$6.63	*
200-300	*	3.09	3.70	3.33	5.15
300-400	1.13	2.07	2.82	3.39	4.24
400-500		2.35	2.13	3.44	3.82
500-600				2.38	3.66
600-700				2.37	3.33
More than 700					3.18

*No data available.

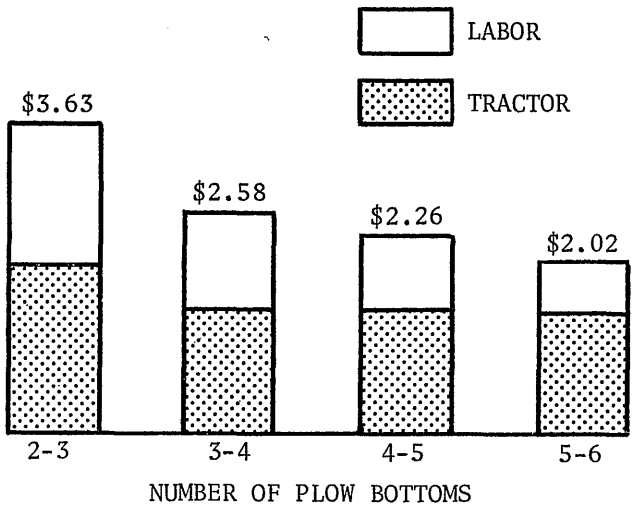

FIG. 2.—Tractor and labor costs per acre for plowing.

was about the same regardless of machine size when each piece of equipment was used a similar number of hours. The use of large machines permitted a reduction in hours of labor required, and thus labor costs were reduced when an adequate volume of use was attained. For example, a 4 to 5 plow tractor costs $2.38 per hour when used 500 or more hours per year compared to $2.07 to $2.35 per hour for a 2 to 3 plow tractor used 300 to 500 hours per year. When labor costs and tractor use costs were combined, large tractors had much lower costs per acre of use than small tractors (Figure 2).

Large tractors displayed a cost advantage since labor costs were spread over more acres and bushels of products. Reduction in machine use costs per acre on large farms can be attributed to more efficient use of labor.

A similar relationship was found for combine utilization and costs. Farmers using a combine to harvest an average of 82 acres of small grain and corn per year had average costs of $11.72 per acre. Operators combining 700 to 1000 acres per year experienced use costs of $4.25 to $4.50 per acre. It is significant to note that two-row corn combines exhibited costs which compared with costs of four- and six-row units when acreages harvested per row of capacity were comparable (Table 10).

Three-row combines had higher costs per acre than the other size machines. The area harvested per row capacity averaged 165 acres for two-row combines, 148 acres for three-row combines, 189 acres for four-row combines, and 181 acres for six-row combines.

If a larger acreage had been harvested with the three-row combines, costs would have been comparable. The two-, four-, and six-row machines were used to harvest 17 to 41 more acres per row than the three-row machines. It is apparent that the combine owners were aware of machine use costs. The large acreages harvested by owners of some large machines may not provide adequate risk protection. During unfavorable conditions, crop loss costs may more than offset the low use costs achieved during favorable seasons.

Corn acreage accounted for more than half (55 percent) of the average 445 acres combined per farm. Soybeans accounted for 25 percent and small grains 20 percent of the total harvested acreages (Table 11).

LAND AND FERTILITY COSTS

Corn yields for the high-profit farm operations averaged 102 bushels per acre for the southwestern area and 120 bushels per acre for the northwestern area of Ohio (Table 12). Land and fertility costs totaled $44.75 for the southwestern and $55.23 for the northwestern areas. The differences in land

TABLE 10.—Harvesting Costs per Acre by Size of Combine, 22 Ohio Farms.

Size (Corn Rows)	Acres	Acreas per Row of Header	Equipment and Labor Costs per Acre
2	329	165	$5.85
3	445	148	7.46
4	757	189	5.98
6	1085	181	5.43

Costs per acre exclusive of labor were: 2-row, $4.61; 3-row, $6.17; 4-row, $5.34; 6-row, $4.64.

TABLE 11.—Acres Harvested per Combine by Crops on 34 Ohio Farms, 1968.

Crops	Acreage	Percent
Corn	245	55
Soybeans	110	25
Small Grains	90	20
TOTAL	445	100

TABLE 12.—Corn Yields, Land and Fertilizer Costs, Ohio, 1968.

	Area	
	Southwestern	Northwestern
Yields	102 bu.	120 bu.
Land Costs	$27.62	$38.37
Fertilizer Costs	17.13	16.86

charges reflect land productivity as evaluated by the farm operators.

Over-pricing or over-payment for land can offset any possibility of profit. Efficiencies in equipment usage, labor, seed, and chemicals offered limited but important opportunities for cost reductions.

CROP YIELDS AFFECT CROP COSTS

High-yield crop producers generally had lower costs per bushel or per ton than operators experiencing low yields. On well-managed western Ohio farms, 100 bushels per acre of corn can be produced for about 85¢ to 90¢ per bushel. Eighty bushel yields will cost about $1.00 to $1.10 per bushel. Forty-five bushel yields of wheat per acre can be produced for about $1.40 a bushel, but 35 bushels per acre cost about $1.90 per bushel. Four tons of hay per acre can be produced for about $18 a ton, while a total realized yield of only 1 ton per acre would cost about $40.

High yields reduced the cost of producing a bushel of grain by about 25 percent, the cost of producing a ton of silage by a third, and the cost of producing a ton of hay by more than 50 percent. These reductions in costs per unit of output are considerably greater than the cost reductions made by increasing the farm unit land area.

High crop yields can be produced more cheaply per bushel or per ton than low crop yields because the high fixed expenses are similar for both situations. Costs of plowing, discing, planting, and cultivating are about the same per acre regardless of yields.

The most efficient crop producer may not have the lowest costs per acre because of larger expenditures for fertilizers, lime, and seed, and higher labor and equipment costs for harvesting larger yields. More profit per acre is possible for the efficient crop farmers because of higher yields and lower production costs per bushel or ton produced.

Fertilizer applications needed to produce several levels of crop yields are shown in Table 13.

Labor and management income figures show the relative profitability of several different rotations when yields of 100 bushels of corn, 32 bushels of soybeans, 45 bushels of wheat, and 2.9 tons of hay per acre are produced.

TABLE 13.—Fertilizer Used and Yields per Acre on Typical Western Ohio Soils.*

	Yields per Acre	N	P_2O_5	K_2O
Corn	80	90	30	30
Soybeans	100	120	40	40
Wheat	120	140	45	45

*Agronomy Guide, Cooperative Extension Service, The Ohio State University, Bull. 470.

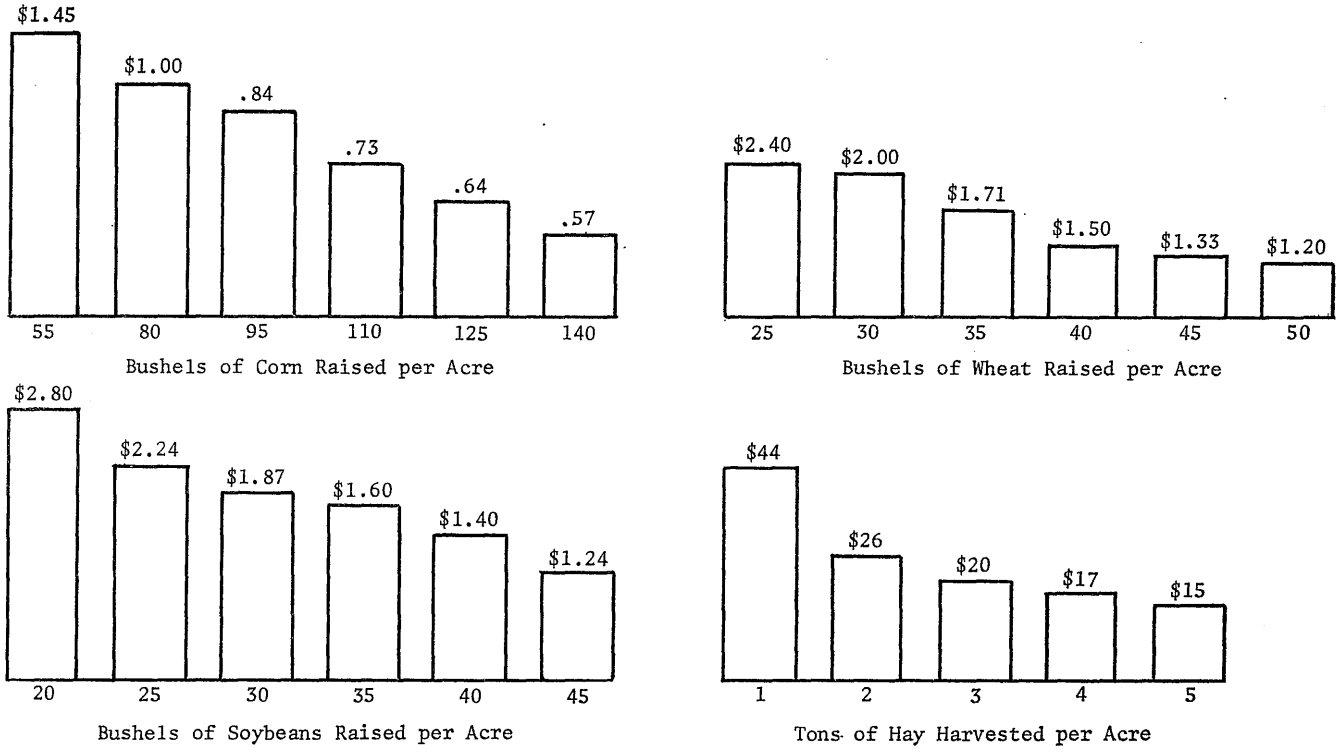

FIG. 3.—Increased yields reduce crop costs per bushel or per ton.

TABLE 14.—Calculated Average Yearly Labor and Management Income per Acre for Different Cropping Systems.

Rotation	Income per Acre
Corn, Soybeans, Wheat, Hay	$13.23
Corn, Corn, Wheat, Hay	13.30
Corn, Corn, Corn, Wheat, Hay	17.37
Continuous Corn	22.50
Continuous Soybeans	22.25

On land not subject to erosion and adapted to corn and soybeans, more acres in these crops will usually mean higher profits per acre.

For the most profitable crop production, the combination of crops grown should be examined periodically to determine the desirability of cash sales compared with feeding livestock. New developments in varieties, reductions in fertilizer costs, and changes in markets often change considerably the most profitable combination of crops which can be grown on a particular soil.

The following are generally considered high-profit crops: vegetable crops, sugar beets, corn, soybeans, and alfalfa hay. Low-profit crops usually include oats, clover-timothy hay, rye, barley, and in recent years wheat. The farm manager should strive for the most profitable crop which his resources will allow him to produce and market efficiently.

TABLE 15.—Receipts, Expenses, and Profits from Growing an Acre of Corn and Hay in Western Ohio.

	100 Bu. Corn	3.7 Tons Hay
Prices	$1.05/bu.	$20.00/ton
Receipts	$105.00	$74.00
Expenses		
Labor	$ 6.00	$ 9.00
Tractor	5.00	6.30
Machinery	20.00	11.75
Fertilizer and Lime	20.00	1.40*
Seed	5.00	2.60
Spray	2.50	.40
Land	30.00	26.30
TOTAL	$88.50	$57.75
Profits	$16.50	$16.25

*Fertilizer applied to hay. Residual soil fertility was not included.

PROFITS FROM CORN AND HAY COMPARED

Which is more profitable—corn or hay? The answer to this question depends on the yields of corn and hay and the market prices of these crops when they are sold or fed to livestock.

The study of crop costs in western Ohio indicated that a hay yield of about 3.7 tons of $20 per ton hay is needed to equal a yield of 100 bushels of corn per acre. Labor and management returns from meadow crops will equal those from corn when high hay yields are obtained and the market value averages $20 per ton or higher. The profit return per acre as shown in Table 15 is $16.50 for 100-bushel corn yields and $16.25 for 3.7-ton hay yields.

Efficient feeding of livestock increases farm income, even if feed is purchased. However, if livestock feed is valued at market prices, the profitability of corn and hay products would be comparable.

SUMMARY

Detailed crop production cost information was obtained from 52 farm cooperators in the north central, northwestern, and southwestern areas of Ohio for 1968.

The average costs of producing a bushel of corn were 97¢; soybeans, $2.04; oats, 71¢; wheat, $1.51; a ton of corn silage, $6.06; and a ton of hay, $19.71. For the high-profit quartile of operators, production costs were: corn, 74¢ per bushel; soybeans, $1.51; oats, 60¢; wheat, $1.18; corn silage, $4.83 per ton; and hay, $13.81 per ton. In contrast, the high-cost, low-profit farmers had costs of producing a bushel of corn, $1.16; soybeans, $2.63; oats, $1.03; wheat, $1.95; corn silage, $7.51 per ton; and hay, $39.59 per ton.

Land and fertilizer comprised 60 percent of total crop production costs; labor, 30 percent; and seed, chemicals, and other inputs, 10 percent. Some of these small-cost items such as seed resulted in major profit differences. Seed costs for high-profit farms were 43¢ per acre higher for corn and 53¢ per acre higher for soybeans than for low-profit farms, while all other costs except harvesting were lower.

Size of operation and equipment use efficiency resulted in important cost differences.

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The State Is the Campus for Agricultural Research and Development

Ohio's major soil types and climatic conditions are represented at the Research Center's 13 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers.

Research is conducted by 15 departments on more than 6500 acres at Center headquarters in Wooster, nine branches, Green Springs Crops Research Unit, Pomerene Forest Laboratory, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Green Springs Crops Research Unit, Green Springs, Sandusky County: 26 acres

Jackson Branch, Jackson, Jackson County: 344 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Pomerene Forest, Laboratory, Keene Township, Coshocton County: 227 acres

Southeastern Branch, Carpenter, Meigs County: 330 acres

Southern Branch, Ripley, Brown County: 275 acres

Western Branch, South Charleston, Clark County: 428 acres